Used Nuclear Fuel
Yucca Mountain

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Steven P. Kraft
Director
Waste Management

Yucca Mountain

- The Yucca Mountain project is of critical importance
- Ultimate disposal of commercial used fuel and defense waste must be achieved
- The Yucca Mountain licensing process must be completed in an effective and timely manner
- Considerable progress on technical issues has been made
- Government must maintain strong commitment to overcoming near term challenges
- Current strong support for nuclear energy provides opportunity for progress in used fuel disposal

Question: "Overall, do you strongly favor, somewhat favor, somewhat oppose or strongly oppose the use of nuclear energy as one of the ways to provide electricity in the United States?"

The Fundamental Importance Of Nuclear Energy Demands Progress On Waste

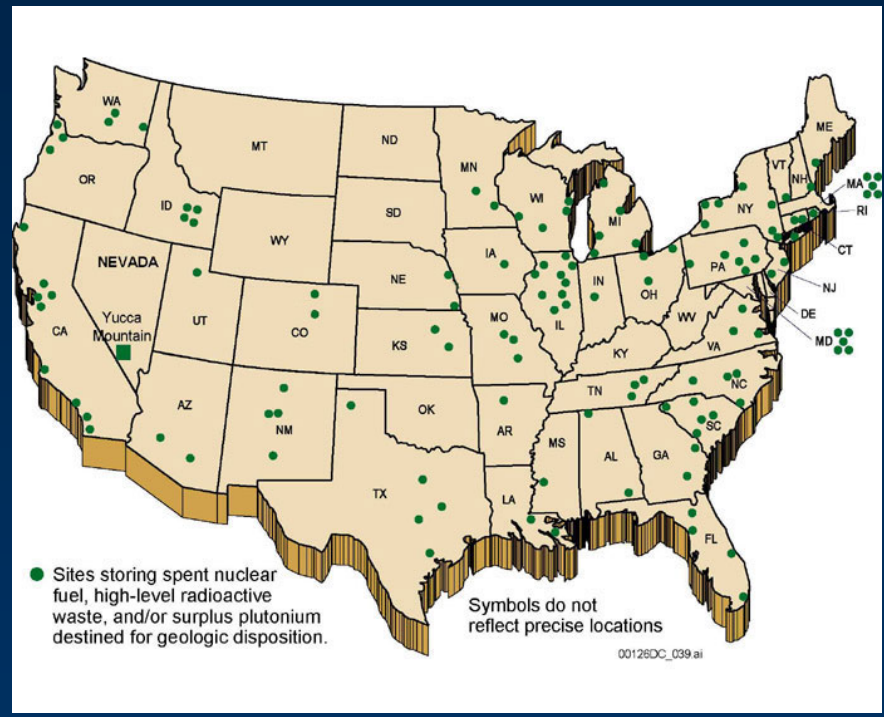
- Nuclear Energy is:
  - US's largest source of emission-free electricity and 2nd largest source of power – 20% of US electricity
  - Important to national security – not dependent on unreliable foreign supplies or subject to disruptions
  - "Baseload" capability that stabilizes US electric grid
  - Reliable low-cost energy supply due to strong operational performance
  - Becoming a preferred option for new generation, *if progress towards waste **disposal** continues*

Used Nuclear Fuel

- Solid ceramic pellets encased in metal clad rods
- 40 years of nuclear electricity have produced only a small amount
  - entire inventory would cover a single football field < 10 yards deep

Used Nuclear Fuel Storage ≠ Disposal

- Current commercial used fuel inventory
  - Approximately 52,000 MTU
- Current dry storage inventory
  - 7,200 MTU
  - 690 casks/canisters loaded
  - At 30 sites
- Future dry storage inventory by 2010
  - Estimating 13,500 MTU
  - 1,300 casks/canisters loaded
  - At 51 sites for 81 plants



Used Nuclear Fuel Storage in California

- San Onofre
  - 2 Operating reactors
  - 1 Shutdown reactor
  - 1006 MTU in pool storage
  - 145 MTU in 17 dry storage casks
- Diablo Canyon
  - 2 Operating reactors
  - 868 MTU in pool storage
  - Dry storage soon
- Rancho Seco
  - Shutdown reactor
  - 215 MTU in 21 dry storage casks
- Humboldt Bay
  - Shutdown reactor
  - 29 MTU in pool storage
  - Dry storage soon

Transportation

- DOE transports used fuel to repository
- NRC regulations: casks and notification
- DOT regulations: highway routing, etc.
- DOE working with state regional groups on plans for routing, emergency planning, etc.
- DOE issued Strategic Plan; selected mostly rail and Caliente Corridor in NV; decided to use dedicated train service

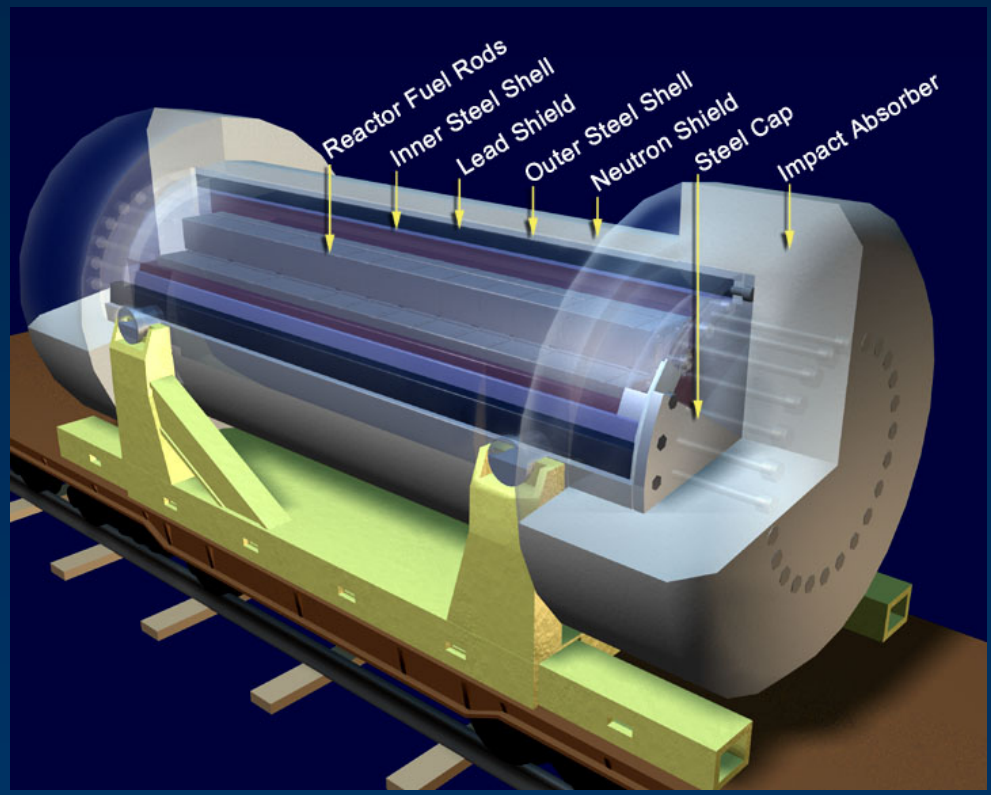
Transporting Used Nuclear Fuel

Safety every step of the way

- Design
- Protective measures in route
- Stringent regulations
- Emergency preparedness
- Testing
- Experience

Safety Every Step of the way - Design

- Nuclear fuel is transported in strong vault-like containers
  - Truck containers weigh 25 to 40 tons
  - Rail containers weigh 75 to 125 tons
- Multiple barriers provide “defense in depth protection”



Safety Every Step of the way – Protective Measures en route

- Stringent permitting requires carriers to demonstrate safety
- Route designation requires a comprehensive analysis and State/local government input
- Inspections are conducted to assure that safety measures are being applied
- Shipments are carefully tracked and monitored
- Armed law-enforcement escorts provide security

Safety Every Step of the way – Stringent Regulations

- All containers must be certified by the Nuclear Regulatory Commission
- Certification requires that rigorous engineering and safety criteria be met
- Containers are required to be capable of withstanding severe accident conditions

Safety Every Step of the way – Emergency Preparedness

- The federal government provides funding to train and equip state and local emergency responders for used fuel accident response (sec. 180(c))
- Effective emergency response assures that public safety is maintained even in the event of a severe accident
- Federal agencies and electric utilities can also provide highly skilled assistance to emergency responders

Safety Every Step of the Way - Testing

- Containers are required to withstand
  - 30 ft. fall onto an unyielding surface (equivalent to a 120 mph crash into a bridge abutment)
  - Puncture test (40 ft fall onto 6 in spike)
  - 30 minutes fully engulfed in a 1,475 F fire
  - Underwater submergence for 8 hours

Safety Every Step of the Way - Experience

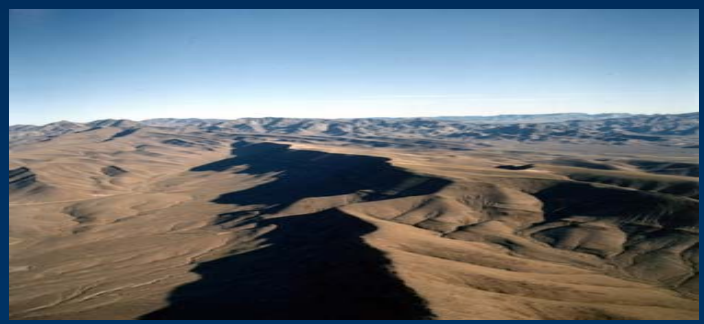
- Four decades of safety.
- Over 3,000 shipments in US.
  - 78% by truck and 22% by rail.
  - Transported over 1.7 million miles
- Over 24,000 shipments internationally.
  - More than 73,000 MTHM SNF/HLW transported
- No release of the radioactive contents from the transport cask; no injury due to radioactive nature of the shipments.

Safety Every Step of the Way – Experience

- "Numerous shipments have been made through Kansas the last few years, all without a safety related incident. The Patrol is confident that the continued partnership with custodians, shippers, and the emergency response community will allow us to continue this spotless record" – Capt. Timothy Lockett, Kansas Hwy. Patrol
- "During the past 18 years, we've inspected and escorted over 480 highway and rail shipments" – Tim Runyon, Illinois Dept. of Nuclear Safety
- "A hazardous materials officer of the Iowa Department of Public Health escorts every spent fuel shipment by truck from border to border" – Don Flater, Iowa Dept. of Public Health

Yucca Mountain: The Path Forward

- A high level waste repository is essential to meet US energy, environmental, and national security needs under all policy scenarios.
- Research has determined that Yucca Mountain can serve as a scientifically sound geologic repository.
- Yucca Mountain can be licensed to standards that provide reasonable assurance of public health and safety.
- Advanced reprocessing technologies can be deployed in conjunction with the repository to improve future inventory management



The nation must actively support the successful licensing of a geologic repository **at Yucca Mountain**.

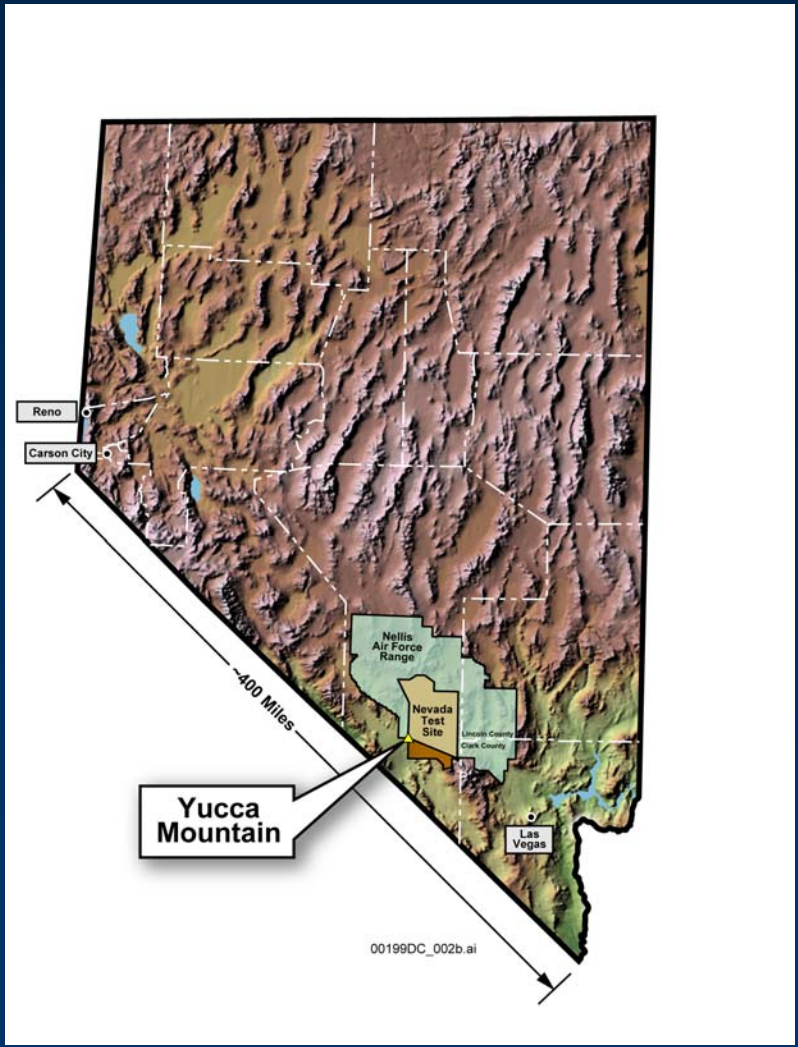
Yucca Mountain Situation Summary

- DOE implemented significant management improvements
  - NRC has recognized improvements
- Court ordered EPA to address compliance beyond 10,000 years
- NRC struck DOE licensing document availability certification
  - Recertification anticipated in September
- Allegations of USGS document falsification (1998-2000 timeframe)
  - DOE's addressing in context of improved culture
- DOE announced delay in license application filing and that 2010 repository date will not be met

Yucca Mountain Situation Summary
(continued)

- DOE has requested FY 06 funding of $651 million
  - House provides $661 million – interim storage & reprocessing – possible new legislation
  - Senate calls for FY 05 level of $577 million
  - FY 05 funding was $303 million below DOE request
  - Legislation still needed to assure Nuclear Waste Fund spent on intended purpose
- Contract disputes
  - Exelon settlement means the meter is running on DOE performance

Yucca Mountain Situation Summary
(continued)



- Strong support for project in Bush administration and large bipartisan majority in Congress
- Nevada congressional delegation strongly opposes project
- "For a Better Nevada" coalition of Nevada business and community leaders has come forward seeking a dialogue with DOE on potential benefits of Yucca Mountain

Nuclear Waste Fund
(as of 3/31/05)

	Billions
On-going (1 mill/kWh) *	12.176
One-time fee paid*	1.486
Interest earned in NWF *	9.491
Defense payments	2.636
Total costs	(8.464)
Balance	17.325

One-time fee owed: $2.813 *

*Total customer commitments: $25.966

Yucca Mountain Industry Focus

- High quality Yucca Mountain license application
  - Can be filed when ready
  - Requires thorough assessment of the impact of USGS improprieties
- Integration of repository & existing waste management system
- Sensible EPA standard
  - Via Congress
  - Via EPA (draft available)
- Adequate FY06 appropriations
- Transportation strategy – NV rail – state regional groups
- Representing industry interests in the licensing process
- Nuclear Waste Fund budget reform

Integrated Waste Management – Today

- Effective integration of repository and existing storage & transport systems will be key to timely waste acceptance
- System integration issues loom large in ongoing repository surface facility design effort
- Industry is prepared to work with DOE toward integration while preserving all contract rights
- Progress on integration will support repository licensing

Integrated Waste Management – Future

- Research on advanced reprocessing technologies could result in enhanced nuclear fuel cycles and improved waste forms
  - MOX fuel
  - Vitrified waste
  - Next Generation Reactor fuel concepts
- Improved waste forms could provide for more efficient usage of Yucca Mountain capacity
- Industry is prepared to work with DOE on the development of new technologies
- Repository license can be amended to incorporate new technologies

EPA Standard Must be Addressed

EPA proposal includes

- Requirements to address long term climate change
- Requirements to address/bound features, events, and processes likely to occur over a longer period
- Recognition that probability calculations over longer time frames must account for uncertainties
- An two tiered dose limit
  - 15 millirem < 10,000 years
  - 350 millirem > 10,000 years (to account for greater analytical uncertainty)
- A separate groundwater standard for the first 10,000 years

Yucca Mountain - Legal/Regulatory Framework

- Waste Confidence (10 CFR Part 51)
  - 51.23 specifies that the waste disposal question is not required to be considered in any reactor licensing action
  - NRC revisits Part 51 only if "unexpected events" cause doubt
- Yucca Mountain will be licensed in 3 stages (10 CFR Part 63)
  - Construction, Receive/Posses, & Closure
  - Period to closure = 50 to 300 years - or longer
- DOE required to monitor, conduct confirmatory analysis, and maintain retrievability until closure (10 CFR Part 63, Subpart F)
  - There is significant interest in enhancing this aspect of repository licensing, including from those in Nevada

Encouraging Signs of Progress

- DOE and NRC have made substantial progress on technical issues during the pre-licensing phase of the project – continue to work on resolving issues
- The Nuclear Waste Technical Review Board issued a 2004 year end report highlighting several “areas of progress”
- DOE has successfully implemented a management improvement initiative and is effectively measuring performance toward completing a high quality license application
- Formation of Nevada Coalition
- Support in Administration and Congress

Conclusion

- Yucca Mountain is an important national priority
- The repository is technologically sound
- Near term challenges exist, but they can be met
- Full appropriations and funding reform are still needed
- There are encouraging signs of progress
- The federal government must remain committed to continuing to move the program forward